

Roll No. :

Total No. of Questions : 9] [Total No. of Pages : 4

67008-N

M.C.A. 1st Semester (Regular)
(Two Year Programme)
Examination, April-2021
(w.e.f. 2020-21)

ADVANCED DATA STRUCTURES USING C++/JAVA Paper-20MCA21C5

Time : **Three Hours**] [Maximum Marks : **80**

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note :- Attempt *five* questions in all, selecting *one* question from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

1. (a) What is Dijkstra's algorithm ?
- (b) What is 8-Queens problem ?
- (c) What do you mean by Non-deterministic algorithms ?

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- (d) What is Divide and Conquer method ?
- (e) What is Skew Heap ?
- (f) What do you mean by Recurrences ?
- (g) What are Euler graphs ?
- (h) What is DFS traversal ? 2×8=16

Unit-I 16 each

2. (a) What is Substitution Method ? How is it significant ? Illustrate.
- (b) What do you mean by Complexity of Algorithms ? What is the importance of algorithm and data structure in computer sciences ? Explain.
3. Explain the following :
 - (a) Master Method
 - (b) Recurrence Tree Method

Unit-II 16 each

4. (a) What are AVL Trees ? What are their applications ? How are these implemented ? Illustrate.

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- (b) What is Binary Search ? Determine its complexity and write down an algorithm for binary search technique.

5. Explain the following :

- (a) Splay tree and their implementation
- (b) Threaded binary tree

Unit-III

16 each

- 6. (a) What are Kruskal's algorithms ? How these results in a minimum cost-spanning tree ? Illustrate.
 - (b) What is Max flow-Min cut theorem ? How is it relevant ? Illustrate.
 - (c) How is DFS traversal different from BFS traversal ? Discuss their pros and cons.
7. Explain the following :
- (a) Prim's algorithm and its relevance
 - (b) Ford-Fulkerson algorithm

Unit-IV 16 each

- 8. (a) What is Dynamic Programming ? How is it different from greedy methods ? Which techniques contribute to dynamic programming ? Explain.
 - (b) What is 0/1 Knapsack Problem ? How can Greedy method be applied to solve the Knapsack problem ? Justify.
9. Explain the following :
- (a) Knuth-Morris-Pratt algorithm
 - (b) NP Complete problems
 - (c) 8-Queens problem